

WHAT IS CLAIMED IS:

1. A method of fabricating a semiconductor device, the method comprising the steps of:

- (a) forming a silicon oxynitride film on a substrate;
- (b) performing a heat treatment, while keeping a surface of the silicon oxynitride film in contact with a gas containing nitrogen, to introduce at least nitrogen into the silicon oxynitride film; and
- (c) forming a semiconductor film containing an impurity on the silicon oxynitride film.

2. The method of claim 1, wherein the silicon oxynitride film is formed by using an  $N_2O$  gas in the step (a).

3. The method of claim 1, wherein the step (c) includes the substeps of:

- forming, as the semiconductor film, an amorphous silicon film on the silicon oxynitride film;
- implanting impurity ions into the amorphous silicon film;
- and

performing a heat treatment for activating the impurity to change the amorphous film into a polysilicon film.

4. The method of claim 1, wherein the heat treatment is performed at 800 to 1050 °C in the step (b).

5. The method of claim 1, wherein a gas containing nitrogen and oxygen is used as the gas containing nitrogen in the step (b).

6. The method of claim 5, wherein an NO gas is used as the

